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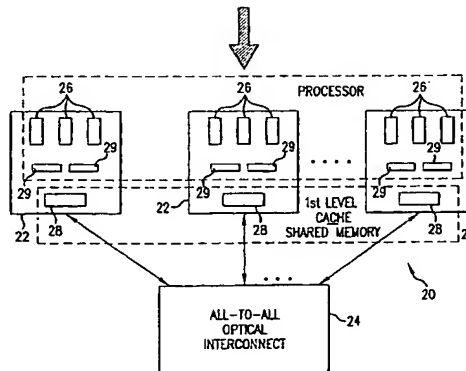
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(54) Title: OPTICAL INTERCONNECT STRUCTURE IN A COMPUTER SYSTEM AND METHOD OF TRANSPORTING DATA BETWEEN PROCESSING ELEMENTS AND MEMORY THROUGH THE OPTICAL INTERCONNECT STRUCTURE



(57) Abstract: A multi-chip processor/memory arrangement replacing a large computer chip, includes a number of modules each including processing elements, registers, and/or memories interconnected by an optical interconnection fabric providing an all-to-all interconnection between the chips, so that the memory cells on each chip represent a portion of shared memory. The optical interconnect fabric is responsible for transporting data between the chips while processing elements on each chip dominate processing. Each chip is manufactured in mass production so that the entire processor/memory arrangement is fabricated in an inexpensive and simplified technology process. The optical communication fabric is based on waveguide technology and includes a number of waveguides, the layout of which follows certain constraints. The waveguides can intersect each other in the single plane, or alternatively, a double layer of waveguide structures and bent over approach may be used. Specific layout patterns of the optical waveguides are presented. The communication of data along the optical communication channels is performed in highly pipelined decentralized routing manner and is envisioned for XMT architecture application.

WO 2004/083904 A2